HYDRA

4 Channel Video Streamer

Document version: A.05

USER MANUAL

Windows® Embedded Partner

PC/104 Embedded Modules

Advanced Micro Peripherals

THE EMBEDDED VIDEO EXPERTS

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Revision History

Document version	Date	Comments	Approved
A.00	14th June 2010	Initial release (waiting for final product photos)	GM/JS/AS
A.01	25th June 2010	Updates to User interface screen images	GM/JS/AS
A.02	28th June 2010	Minor updates.	GM/JS/AS
A.03	5th July 2010	Screen updates.	GM/JS/AS
A.04	20th July 2010	Image updates	GM
A.05	1st April 2011	Update for H.264 CODEC	JS

ISO 9001 REGISTERED FIRM

Advanced Micro Peripherals operates a company-wide quality management system, which has been certified by QMS International plc as compliant with ISO9001:2000

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1: Introduction

The HYDRA-003-001 is a rugged multi-channel video acquisition and network streamer system. The HYDRA unit can capture, encode and stream up to 4 channels of video and a single channel of audio over an Ethernet LAN using a variety of compression levels and streaming rates.

The system is designed for video surveillance in harsh environments and is suitable for use in both static and vehicle installations.

The HYDRA system produces an industry standard MPEG-4 Part 10 (also known as H.264) video plus audio stream using a standard RTP/RTSP IP stream. The I-frame interval for the HYDRA may be set to zero to provide a continuous stream of full resolution frames rather than using intermediate P-frames.

AMP can provide custom configurations (subject to a minimum order quantity) for the HYDRA Video Streamer. Please contact our Sales team (see A: Contacting Advanced Micro Peripherals, page 27) to discuss your requirements.

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Features

- Up to 4 channels of live video inputs (PAL/NTSC).
- Single channel audio input.
- MPEG-4 Part 10 (H.264) video compression option:
  - 4 x D1 size images at full frame rate (25 fps PAL or 29.97 fps NTSC)
- 9 – 40v DC powered operation with supply protection.
- Industry standard RTP/RTSP video/audio stream.
- HTML configuration management screens.
- Standard 10/100baseT Ethernet LAN port.
- MIL-STD-810F environmental compliance.
- Wide operating temperature range (-20°C to +50°C).
- Environmental protection – IP54.
- EMC CE compliant.
- Suitable for direct connection to 12/24v vehicle power systems.

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HYDRA system 'at a glance'

NOTE: Not all variations have all of these connectors

Standard TNC connectors for all video ports

Tough carrying handles

MIL-DTL-38999 compliant RJ45 LAN port connector

Rubber mounting base for improved resilience to high shock / vibration conditions

LED power indicator

6 to 40v power input using MIL-C-26482 compliant connector

Side rails for added protection of connector array

Main power input [locking] switch

Standard TNC connector for audio input

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Technical specification

Video input:	Up to 4 channel composite video input channels Standard CCIR601-NTSC, CCIR-PAL, Software selectable brightness, contrast and saturation control. 1V peak-to-peak (75Ω input impedance).
Video compression:	H.264 video compression. ISO/IEC 14496-10, H.264 Baseline @ Level 3. 4 channel mode D1 size images at full frame rate. Programmable I-frame interval, quality level and bit rate.
IP Stream Latency:	100ms (typ). Based on 4 PAL channel inputs with encoding at D1 resolution, full frame rate at 3Mbps /channel
Audio input:	None
Audio compression:	None
Ethernet port:	IEEE802.3 10/100baseT.
Power:	9 to 40v DC. 1.2A at 24v (typ.) or 2.0A at 12v (typ.) ≈ 30W. Protected against reverse voltage, over voltage and transients.
Environmental:	-20ºC to +50ºC. Passive cooling (no fans).
Physical size:	Approximate dimensions – 260mm (length), 165mm (high), 180mm (wide).
Weight:	4.05Kg.
Enclosure:	Anodized aluminum alloy extrusion, rubber base-plate and stainless steel fixings. End plates sealed with rubber gasket.
Paint:	STANAG 2338 compliant Infrared Reflective.

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Compliance specifications

EMC Immunity: EN61000-6-1:2007 – Generic immunity tests for Information Technology Equipment including:
EN61000-4-3 RF field immunity
EN61000-4-6 RF common mode immunity
EN61000-4-4 Fast transient
EN61000-4-2 ESD

EMC Emissions: EN55022: 2006 A1 (Class B) – Conducted / radiated emission tests for Information Technology Equipment

Vehicle Immunity: ISO7637-2:2004 – Electrical transient conduction on vehicle power lines
(Pulses 1, 2a, 2b, 3a, 3b and 4)

Vibration: MIL-STD-810F Test method 514, Procedure I for General Vibration (Category 20: Ground vehicles)

Thermal Shock: MIL-STD-810F Test method 503, Procedure I.

Enclosure sealing: IP54 (compliant against ingress of dust and water spray – assuming supplied connector covers are used on un-used video/audio and Ethernet ports).

Full details of test reports and associated Declarations of Conformity are available on request.

Network compliance: Real Time Protocol compliant with RFC 3550, as well as Real Time Streaming Protocol (RTSP) compliant with RFC 2326.

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Ordering information

The following part number(s) can be used when ordering:

HYDRA-003-001	Standard AMP 4 channel video streamer system.
HYDRA-xxx-yyy	Where x and y are used to uniquely identify a specific system configurations for the multi-channel HYDRA system.

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2: Installation

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Connecting to the HYDRA video streamer

The front panel uses industry standard connectors for the video, audio, LAN network and power input.

The HYDRA is supplied with dust covers (as shown below) fitted to the video, audio and network (LAN) connectors. Only remove the dust covers from the channels to be used - to ensure environmental compliance, all un-used channels should be fitted with the dust covers.

The video and audio input channels use standard 75Ω TNC connectors. The maximum length for the video and audio cables is not specified, however, excessive cable lengths may impact the quality of video. It is recommended that good quality 75Ω cable is used to connect to the video sources.

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The HYDRA should be connected to a suitable power source (nominally 12 or 24v). The HYDRA includes internal reverse voltage protection and transient suppression, however, there is no internal fuse. It is recommended that an external fuse (≥ 4A) is used within the power supply cable loom to provide added protection.

Note: The HYDRA uses a non-isolated power supply. The 0v (GND) input on the PWR connector is connected internally to the chassis (case) and is also the ground reference for the video input signals.

The Ethernet LAN connector uses a standard RJ45 connector. This may be connected within an Amphenol MIL-DTL-38999 compliant housing as specified in the Connector Description section.

Power Up Sequence.

After connecting the power, video (and optional audio) and LAN inputs, switch ON the unit using the front panel PWR ON/OFF switch (note – this is a locking switch and must be pulled slightly in order to change position). The LED should illuminate to indicate that the internal system is operational.

The system takes approximately 90 seconds to boot and enable access to the browser based HYDRA user interface. At this point, the HYDRA presents the Login screen to request a User Name and Password (refer to User Configuration section for more details). The HYDRA will begin streaming video automatically approximately 1 minute 45 seconds after power up.

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Connector Descriptions

The HYDRA uses industry standard connectors as shown below:

The video and audio connectors should be connected with standard screw fit TNC plugs.

The power connector (PWR) is Amphenol part number 62GB-5016-10-02PB(400). The mating socket and back-shell part numbers are Amphenol 62GB-56TG-10-02-S-B and Amphenol 62GB-776-10.
The Ethernet port connector (LAN) is Amphenol part number PCDRJFTV7SA1N. A standard Cat5 cable can be connected directly to the RJ45 socket (if required) or alternatively, to achieve maximum sealing compliance, a mating receptacle connector (such as RJF TV 6 M N 09-33) can be used to accommodate a standard RJ45 Cat5 – 5e cable assembly.

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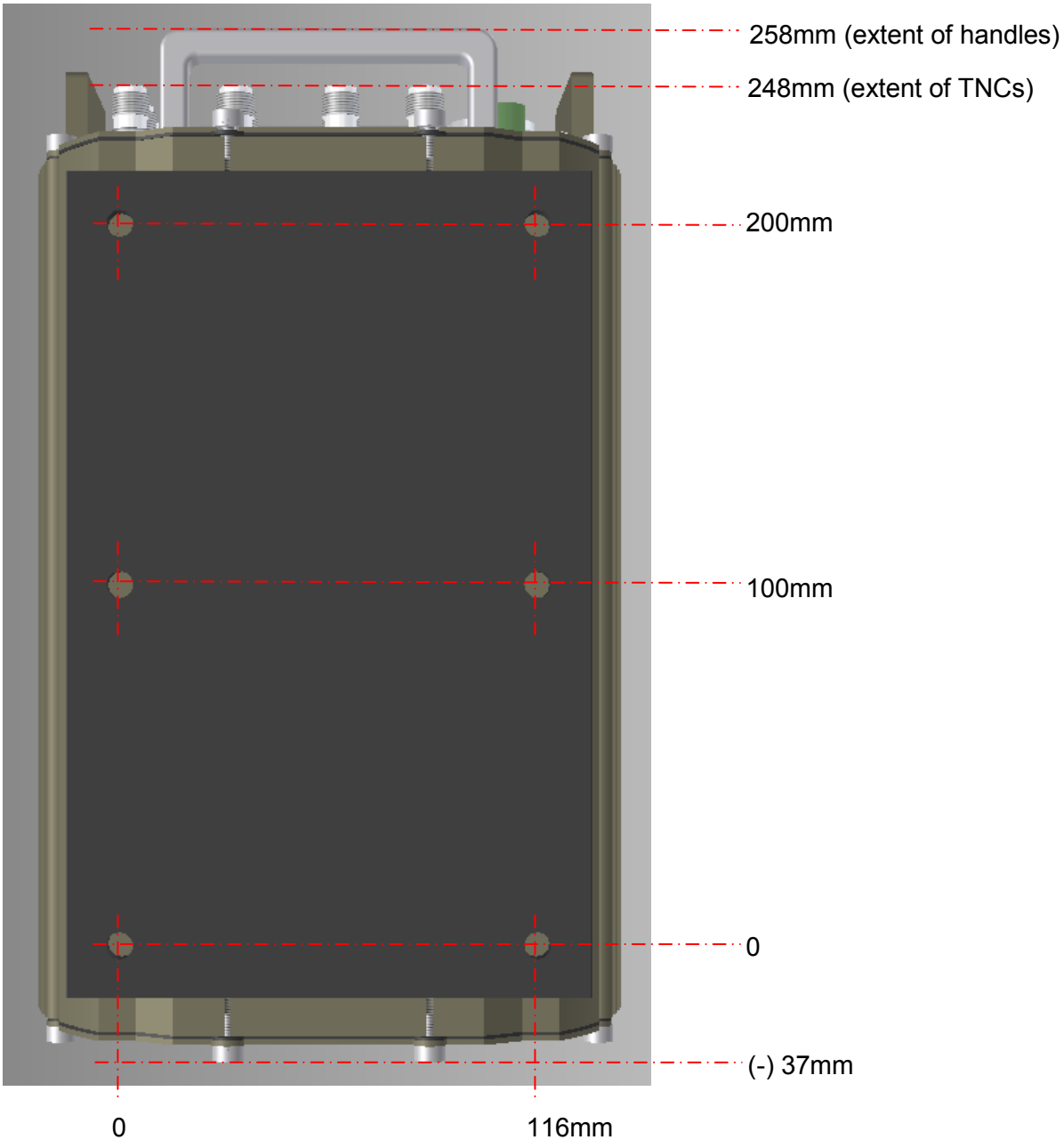
Mechanical Installation.

The HYDRA fixing plate is a semi-rigid rubber base which helps to dampen the affects of vibration and high shock incidents. The fixing points are shown below (6 x 8mm dia. holes):



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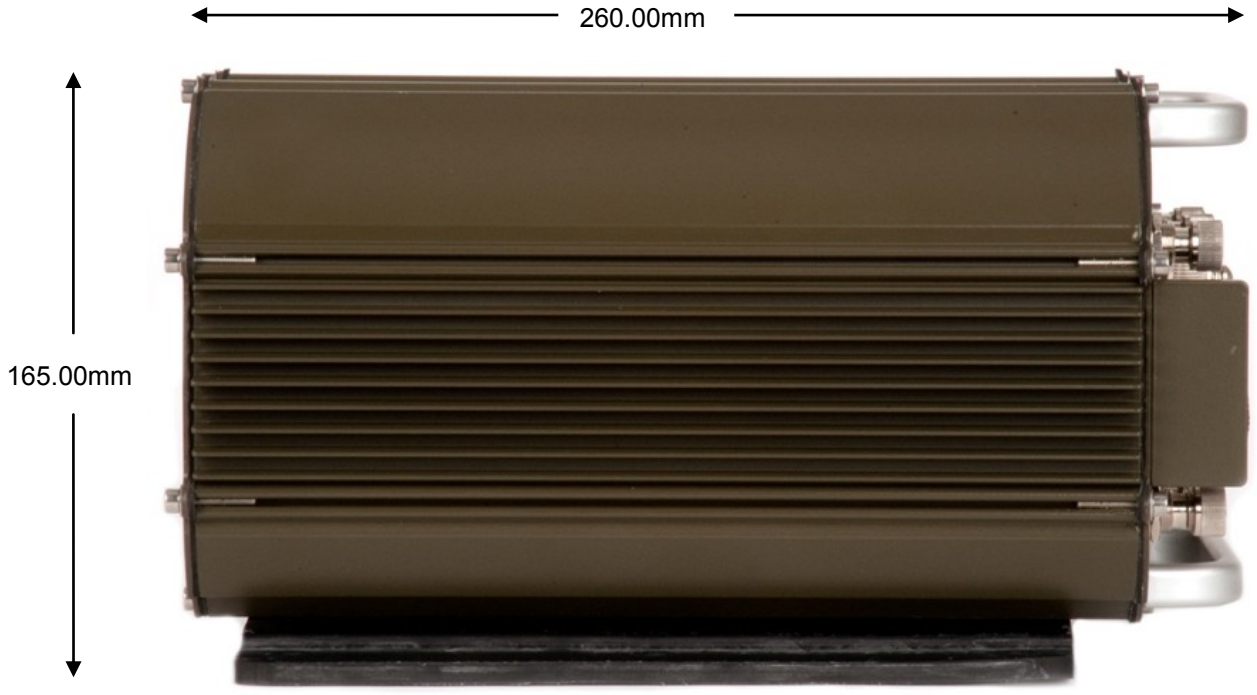

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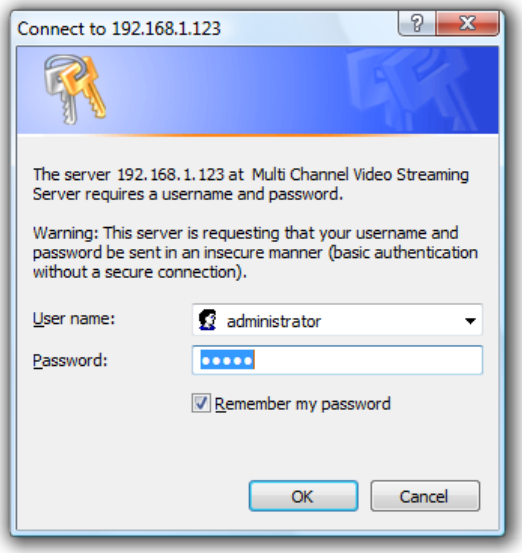
3: User Configuration

The HYDRA includes a number of standard HTML configuration screens which may be accessed via the default IP address http://192.168.1.123:8080/status.php (use full URL). The default user name is **administrator** while the password is **admin**. It is recommended that the password is changed during the commissioning process to a more secure password.


Connect to 192.168.1.123
The server 192.168.1.123 at Multi Channel Video Streaming Server requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
administrator
Password:
Remember my password
OK
Cancel

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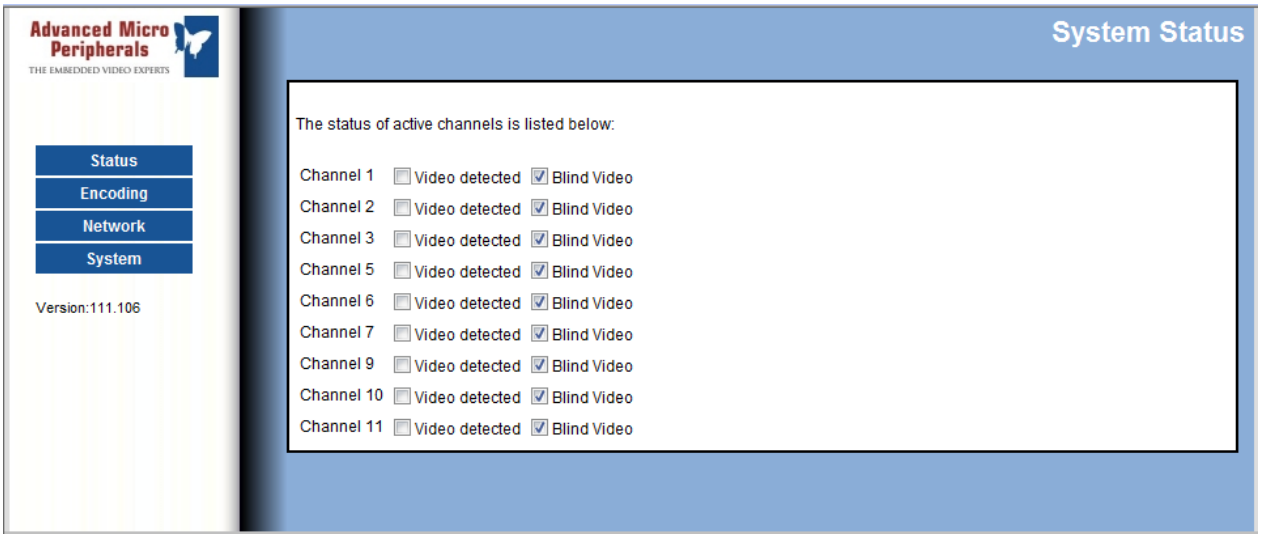
After completing the sign-on, the system will display the initial System Status screen (in this example, it is showing the 9 channel mode).


Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS
Status
Encoding
Network
System
Version:111.106
System Status
The status of active channels is listed below:
Channel 1 Video detected Blind Video
Channel 2 Video detected Blind Video
Channel 3 Video detected Blind Video
Channel 5 Video detected Blind Video
Channel 6 Video detected Blind Video
Channel 7 Video detected Blind Video
Channel 9 Video detected Blind Video
Channel 10 Video detected Blind Video
Channel 11 Video detected Blind Video

The revision information displayed in the left hand panel is identified as follows:

Version: 111. 106

Revision of user interface (HTML screens)

Revision of core HYDRA Streamer software

This page will display all the active channels. For 9 channel mode (as shown above), the HYDRA uses physical channels 1, 2, 3, 5, 6, 7, 9, 10 and 11. The single audio input is always streamed with video channel 1. For 12 channel mode, all physical channels are available.

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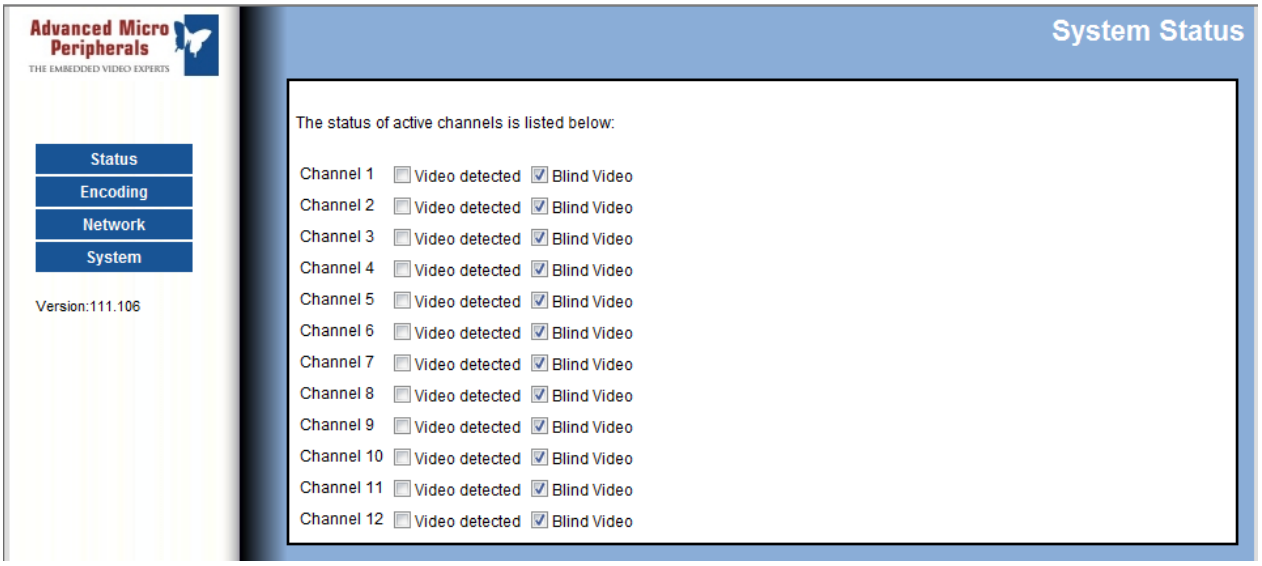
System Status


Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS
Status
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System Status
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Channel 4 Video detected Blind Video
Channel 5 Video detected Blind Video
Channel 6 Video detected Blind Video
Channel 7 Video detected Blind Video
Channel 8 Video detected Blind Video
Channel 9 Video detected Blind Video
Channel 10 Video detected Blind Video
Channel 11 Video detected Blind Video
Channel 12 Video detected Blind Video

The status boxes indicate the activity for each channel:

'Video detected' means that a valid video signal has been detected and is being decoded and streamed.

'Blind video' means that the system has sensed that more than 90% of the screen area is the same color. This can be useful to sense/detect when a camera has been covered (obscured).

NOTE: Hydra-003 does not contain the `Blind video' detection.

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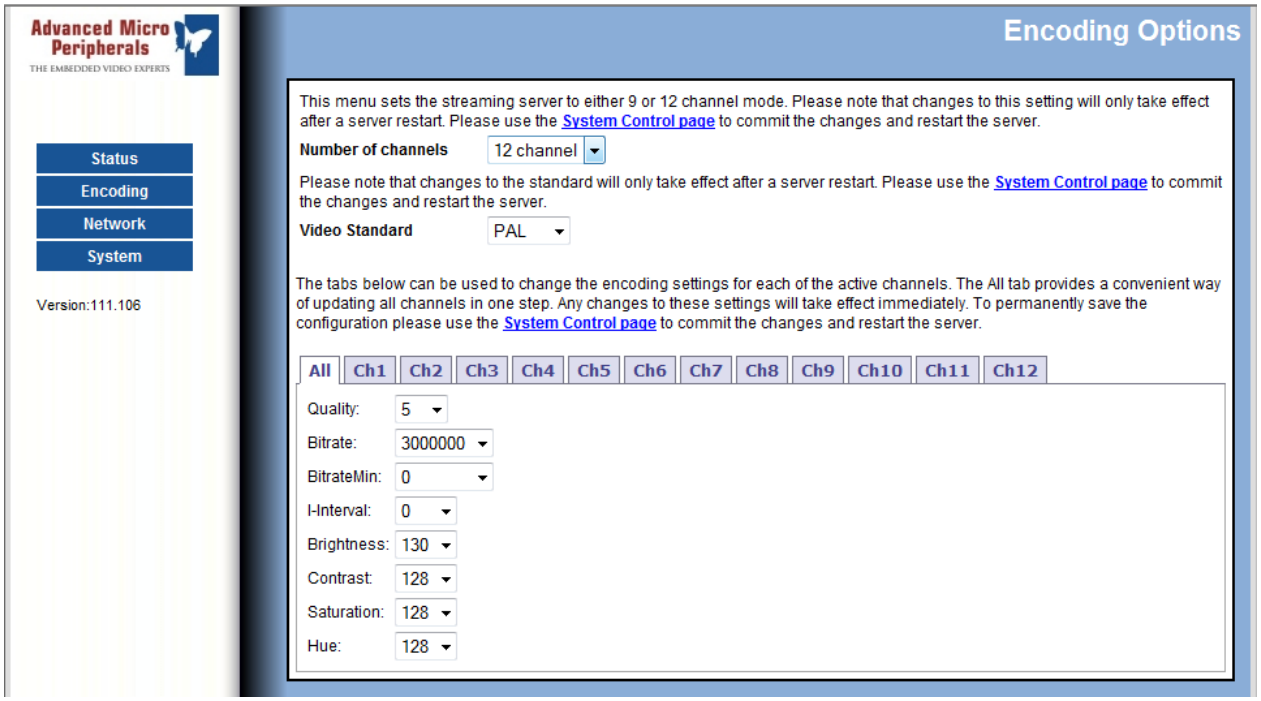
Encoding Options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THE EMBEDDED VIDEO EXPERTS
Status
Encoding
Network
System
Version:111.106
Encoding Options
This menu sets the streaming server to either 9 or 12 channel mode. Please note that changes to this setting will only take effect after a server restart. Please use the System Control page to commit the changes and restart the server.
Number of channels
12 channel
Please note that changes to the standard will only take effect after a server restart. Please use the System Control page to commit the changes and restart the server.
Video Standard
PAL
The tabs below can be used to change the encoding settings for each of the active channels. The All tab provides a convenient way of updating all channels in one step. Any changes to these settings will take effect immediately. To permanently save the configuration please use the System Control page to commit the changes and restart the server.
All
Ch1
Ch2
Ch3
Ch4
Ch5
Ch6
Ch7
Ch8
Ch9
Ch10
Ch11
Ch12
Quality: 5
Bitrate: 3000000
BitrateMin: 0
I-Interval: 0
Brightness: 130
Contrast: 128
Saturation: 128
Hue: 128

The Encoding Options page includes two groups of settings. The 'Number of Channels' may be set to either 9 or 12. When set to 12 channel mode, the HYDRA will stream 12 separate video channels, each running at ¼ frame rate (either 6.25fps for PAL or 7.5fps for NTSC), while in 9 channel mode, each channel will be running at ⅓ frame rate (either 8.33fps for PAL or 10fps for NTSC). If the Number of Channels is changed, this will only take affect by using the Commit button on the System Control page – this will save the system settings and then initiate a reboot of the system.

The physical channels allocated for each mode are as follows:

Channel Number	1	2	3	4	5	6	7	8	9	10	11	12
9 Channel Mode	✓	✓	✓		✓	✓	✓		✓	✓	✓	
12 Channel Mode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

NOTE: Hydra-003 does not have the 'Number of Channels' selection

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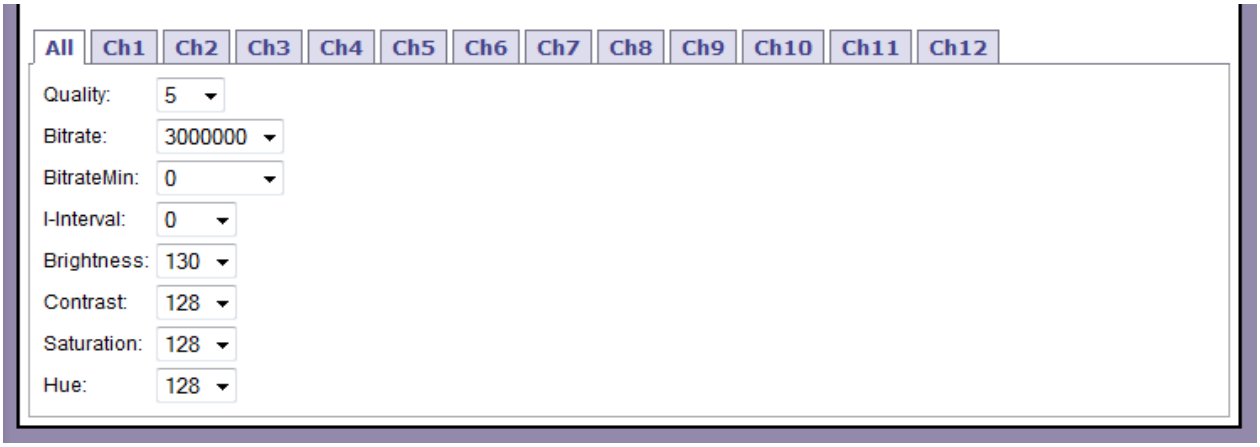
The Video Standard may be set as PAL, NTSC or Auto. The Auto mode will automatically detect and set the video standard. This change will only take affect after using the Commit button on the System Control page.

The operating characteristics for each channel may be set individually or, by using the master control – **ALL**.



Quality Level:	Quality level value setting, range from minimum (31) to maximum (5) Default quality level is 5.
Bit Rate:	The system will always encode the channels at quality level set by the Quality Level parameter until the bit rate hits the maximum value set. The value range is from 500Kbps to 5Mbps in increments of 250Kbps. The system uses Hybrid Bit Rate (HBR) control. Default bit rate is 3Mbps.
BitrateMin:	The system will always stream the channel at a minimum bit rate set by Bitratemin. The value range is from 0bps to 5Mbps in increments of 250Kbps. Default minimum bit rate is 0.
I-Interval:	Defines the I-Frame interval, i.e. the number of frames between each I frame for standard encoding. The value range is from 0 to 255. Default I-Interval count is 0 (i.e. I-Frame only, similar to M-JPEG mode).
Brightness:	Brightness setting for each channel. The value ranges from 0 (min) to 255 (max). The default value is 130.
Contrast:	Contrast setting for each channel. The value ranges from 0 (min) to 255 (max). The default value is 128.
Saturation:	Saturation setting for each channel. The value ranges from 0 (min) to 255 (max). The default value is 128.
Hue:	Hue setting for each channel. The value ranges from 0 (min) to 255 (max). The default value is 128.

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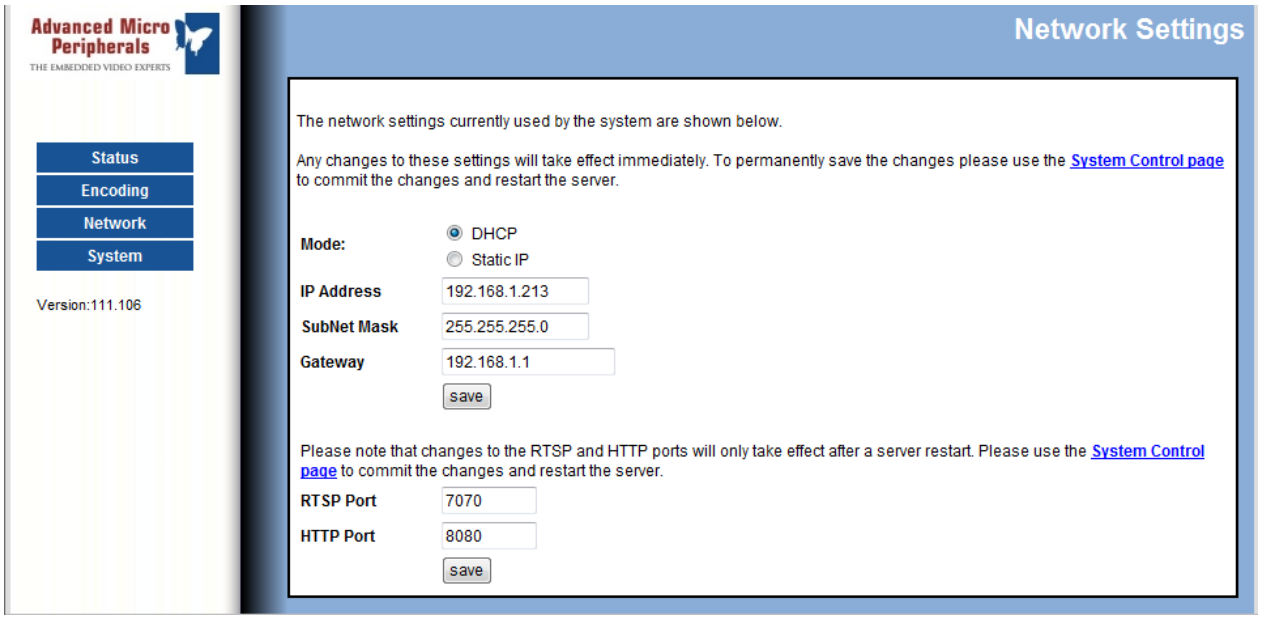
Please note: any changes to these settings will take effect immediately.

When using the **ALL** function, only the parameters which have changed (using the drop down lists) will be updated across all channels. Any changes will take effect immediately.

Network Settings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Status
Encoding
Network
System
Version:111.106
Network Settings
The network settings currently used by the system are shown below.
Any changes to these settings will take effect immediately. To permanently save the changes please use the System Control page to commit the changes and restart the server.
Mode:
DHCP
Static IP
IP Address
192.168.1.213
SubNet Mask
255.255.255.0
Gateway
192.168.1.1
save
Please note that changes to the RTSP and HTTP ports will only take effect after a server restart. Please use the System Control page to commit the changes and restart the server.
RTSP Port
7070
HTTP Port
8080
save

Mode:	DHCP uses an IP address assigned by the local DHCP server. Static IP uses the IP address defined by IP Address. Default mode is Static IP
IP Address:	The IP address should be entered as an IPv4 dot-decimal notation. Default IP address is 192.168.1.123
SubNet Mask:	The SubNet Mask defined the logical address in dot-decimal notation for the local branch of the network. Default subnet mask is 255.255.255.0
Gateway:	The Gateway address defines the node address for router to other networks. Default gateway address is 192.168.1.1
RTSP Port:	The transport layer port number used for RTSP commands. The default port is 7070.
HTTP Port:	The transport layer port number used for HTTP commands. The default port is 8080.

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HTTP and RTSP addresses must be fully and explicitly defined.

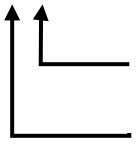
Browser access to the user interface System Status page would be:

http://192.168.1.123:8080/status.php

Note: The IP address may be different to the example shown.

Similarly, to access the RTSP video stream for a given channel would be:

rtsp://192.168.123:7070/UC0_0



Channel number for each card (0 to 3)

System card number (0 to 2)

.

Access to each channel is defined by the following stream addresses:

Chan.	RTSP stream address	Comment
1	rtsp://192.168.123:7070/UC0_0	
2	rtsp://192.168.123:7070/UC0_1	
3	rtsp://192.168.123:7070/UC0_2	
4	rtsp://192.168.123:7070/UC0_3	

Note: The IP address may be different to the examples shown.

System Control

The System Control pages are used to permanently save and invoke the main operating settings for the HYDRA system as well as set the date/time information and the system Password.

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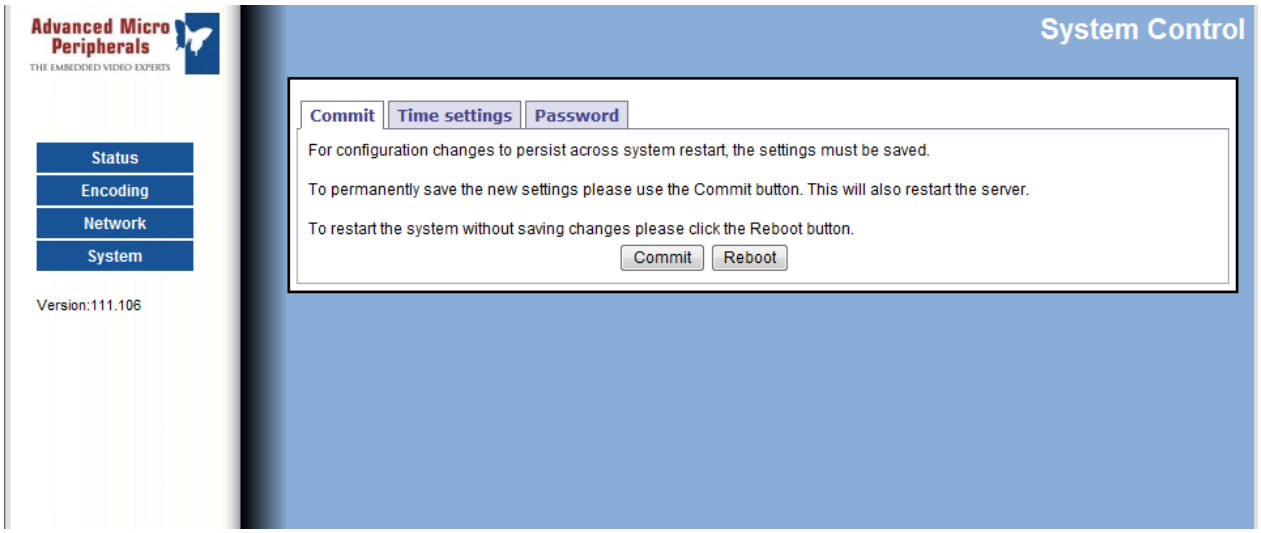
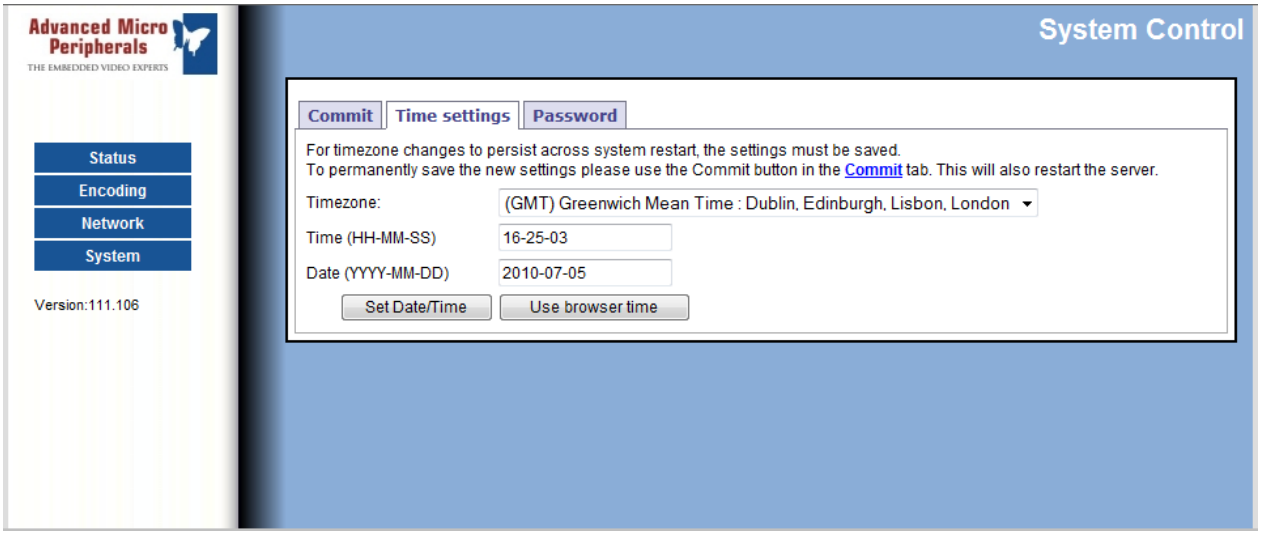


The top level configuration data includes the channel operating mode and the video standard (PAL / NTSC). These modes will only take affect after pressing the Commit button. This will cause the system to permanently save the settings and re-boot the system.

The encoder options and network settings will change immediately (when changed) however, to save the settings, select the Commit button to save and re-boot the system.

IMPORTANT NOTE: This process may take about 90 seconds. It is critical that the system is NOT powered down during this update process. The system should remain on until the system has re-booted and the System Status screen is accessible.



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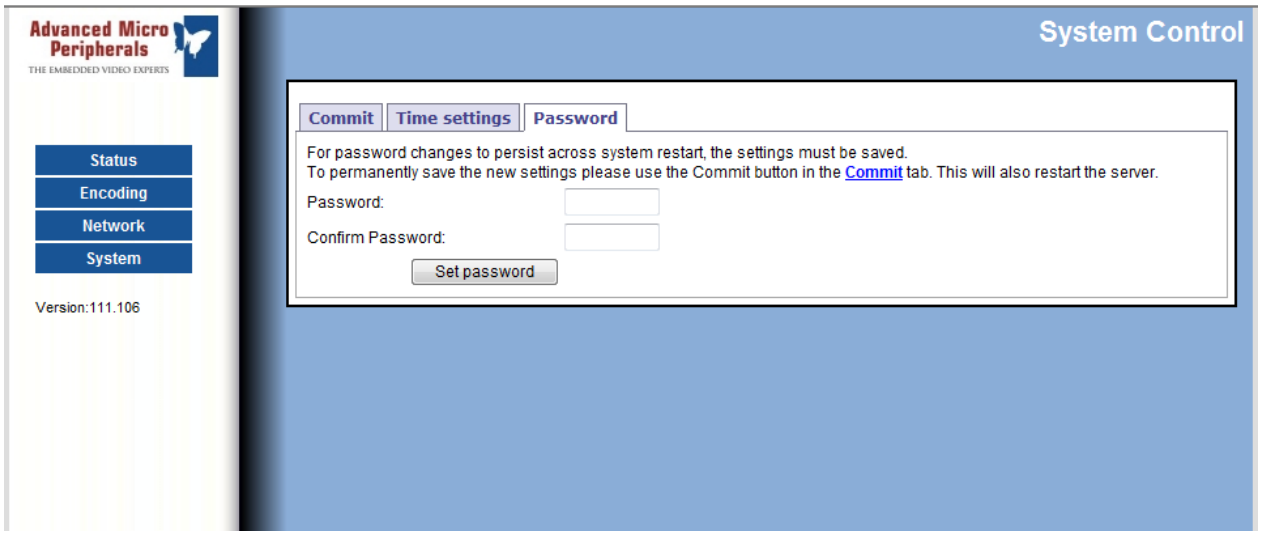
The date and time may be set by manually by changing the time-zone, time and data and then selecting the Set Date/Time button or alternatively, the system can request the date and time information from the system hosting the web browser by using Use browser time.

Note: In this case, only the date and time is updated, not the time-zone.



The default password is **admin**. The new password (up to 8 characters) should be entered and re-confirmed. The operator will be notified with an error message if the two passwords do not match. After changing the password, use the Set password button to save the settings to the HYDRA unit and then the Commit button to permanently save the settings and re-start the system.

IMPORTANT NOTE: It is not possible to automatically recover or reset the password. In the event that the password information is lost, please contact Advanced Micro Peripherals (support@ampltd.com).

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HYDRA Firmware Updates

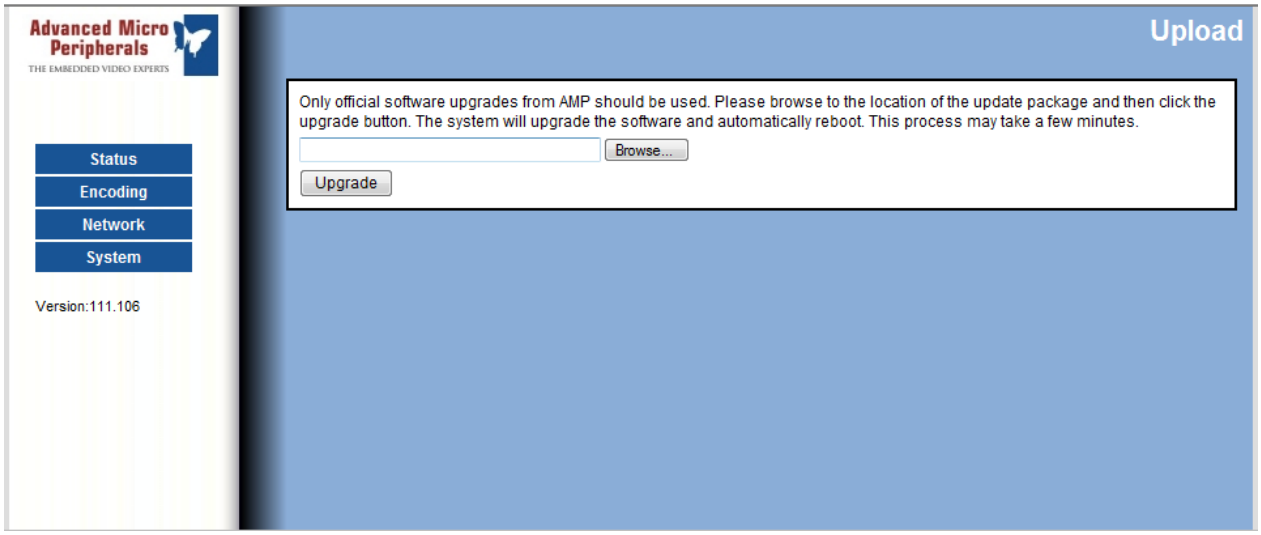
The HYDRA firmware may be updated using a remote access and updating procedure.

Access the Upload page using the following address (this is not accessible from the HYDRA menus):

http://192.168.1.123:8080/upload.php

Note: The IP address may be different to the example shown.

Enter the login and password details as required to gain access to the HYDRA server.


Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS
Status
Encoding
Network
System
Version:111.106
Upload
Only official software upgrades from AMP should be used. Please browse to the location of the update package and then click the upgrade button. The system will upgrade the software and automatically reboot. This process may take a few minutes.
Browse...
Upgrade

Select the Browse button to locate the (.bin) file on your host system and then select the Upgrade button. The file will automatically upload and be saved to the internal storage. The HYDRA will verify that the file is valid and then automatically up-grade and re-start the system. In the event that the file is not accepted, the HYDRA will disregard the file and not re-start – no other warning is given.

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Note: The upgrade process may take several minutes. It is critical that the system is NOT powered down during this update process. The system should remain on until the system has re-booted and the System Status screen is accessible.

After this system re-start, the encoding configuration and system passwords will always be reset to the factory defaults. In some cases, the operating mode (9/12 channel & PAL/NTSC mode) may also be reset. Only the IP address will remain unchanged.

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A: Contacting AMP

Sales

AMP's sales team is always available to assist you in choosing the board that best meets your requirements. Contact your local sales office or hotline.

Sales office US

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Technical support

Comprehensive technical information is available on our websites (see above).

If you can't find the information or solution you require, AMP has a team of technical support engineers / embedded video experts available to provide a quick *and free* response to your technical queries.

Please submit your technical support query to the appropriate email address:

Technical support US

E-mail: support@amp-usa.com

Technical support UK

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